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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

MALDONADO, JULIO J

ART UNIT PAPER NUMBER

2823

DATE MAILED: 02/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/989,263

Applicant(s)

LAMSON ET AL.

Examiner

Julio J. Maldonado

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 17 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 18 is/are allowed.
- 6) ☒ Claim(s) 1,3-7,10-12 and 14 is/are rejected.
- 7) ☒ Claim(s) 2,8,9,13 and 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 1 and 3-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zechman (U.S. 5,824,568) in view of Zhao (U.S. 6,198,170 B1) the Applicants Admitted Prior Art.

In reference to claims 1, 4, 6 and 7, Zechman (Fig.1) teaches a plastic encapsulated semiconductor device including a plurality of wire bonds connecting pads (3) on an integrated circuit chip (1) to conductive leads (5); a parylene sheath (6) surrounding each wire (4), wherein said parylene sheath (6) substantially covers only said wire and wire connection to said pads; and a mold compound (8) encasing the chip (1), sheathed wires, and leads (5), wherein said molding compound (8) comprises an epoxy molding compound (column 1, line 22 – column 3, line 52).

Zechman fails to expressly teach wherein said sheath has a lower dielectric constant than the dielectric constant of said molding compound. However, Zhao teaches that parylene has a dielectric constant of 2.2 to 2.9 (column 14, lines 21 – 45). Furthermore, the submitted disclosure teaches that epoxy-molding compounds have a dielectric constant of 4 (Instant page 5, lines 13 – 14). Therefore, Zechman inherently

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teaches wherein said sheath has a lower dielectric constant than that of the molding compound.

Still Zechman fails to expressly teach wherein said pluralities of wire bonds are substantially parallel, closely spaced wire bonds. However, the prior art (instant Figs. 1a-c) teaches a plurality of substantially parallel, closely-spaced wire bonds (11) connecting pads on an integrated circuit chip (10) to conductive leads (12); a low dielectric constant sheath (not shown) comprising parylene surrounding each wire; and a mold compound (not shown) encasing the chip (10), sheathed wires (11) and leads (12) (instant page 1, line 8 – page 3, line 21). It would have been within the scope of one of ordinary skill in the art to combine the teachings of Zechman and the prior art to enable the arrangement of wire bonds of Zechman according to the teachings of the prior art because the selection of a known material based on its suitability for its intended use supported a prima facie obviousness. See MPEP 2144.07.

In reference to claim 3, the combined teachings of Zechman and the prior teach wherein the thickness of the dielectric sheath is in the range of 2.5 μm to 25.4 μm (Zechman, column 2, lines 43 – 45). Still, the combined teachings of Zechman and the prior art fail to teach wherein the thickness of the dielectric sheath is 2.5 microns, minimum. However, in the case where the claimed ranges “overlap or lie inside ranges disclosed by the prior art” a prima facie case of obviousness exists. MPEP 2144.05. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the thickness range disclosed in the combined teachings of Zechman and the prior art to arrive at the claimed invention.

In reference to claim 5, the combined teachings of Zechman and the prior art substantially teach all aspects of the invention but fail to disclose wherein the distance between wires is in the range of 50 to 100 microns. Notwithstanding, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose these particular dimensions because applicant has not disclosed that the dimensions are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using another dimension. Indeed, it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

3. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zechman ('568) in view of Zhao ('170 B1) et al and the prior art as applied to claims 1 and 3-7 above, and further in view of Choi (U.S. 6,013,109).

The combined teachings of Zechman and the prior art substantially teaches all aspects of the invention but fail to show that said device is a Ball Grid Array package or a leaded surface mount package. However, Choi et al. (Figs.3A-3D) teach a crack-resistance semiconductor package including the device packaged in a ball grid array

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package or as a leaded surface mount package (column 2, line 66 – column 3, line 45).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to enable the package of the Zechman and prior art to be a Ball Grid Array package or a leaded surface mount package.

4. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over the prior art in view of Kim et al. (U.S. 5,801,074).

The prior art (instant Figs.1a-c) teaches a plurality of substantially parallel, closely-spaced wire bonds (11) connecting pads on an integrated circuit chip (10) to conductive leads (12); and a low dielectric constant sheath (not shown) comprising parylene surrounding each wire (instant page 1, line 8 – page 3, line 21).

The prior art fails to teach a semiconductor package having leads, a substrate, and a housing shell surrounding an open cavity. However, Kim et al. (Figs.7a-7b) teach an air-tight semiconductor package including a housing shell (71) surrounding a cavity (column 3, line 24 – column 9, line 46). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine the teachings of the prior art and Kim et al. to enable substituting the mold compound of the prior art with the housing shell of Kim et al., and furthermore since this would result in a semiconductor package with improved air leakage and high yield (column 9, lines 18 – 46), and furthermore, because the omission of an element and its function is obvious if the function of the element is not desired. MPEP 2144.04, II A.

5. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over the prior art in view of Kim et al. (U.S. 5,801,074) as applied to claim 12 above, and further in view of Huang et al. (U.S. 5,138,431).

The combined teachings of the prior art and Kim et al. substantially teach all aspects of the invention but fail to show wherein said cavity package shell comprises a ceramic. However, Huang (Figs.4 and 5) teaches a semiconductor package including a plurality of substantially parallel, closely-spaced wire bonds connecting pads on an integrated circuit chip (24) to conductive leads (22b) encased in a ceramic cavity packaged shell (column 9, lines 15 – 43).

It would have been within the scope of one of ordinary skill in the art to combine the teachings of the prior art and Kim et al. to enable the cavity shell of the prior art and Kim et al. according to the teachings of the prior art because the selection of a known material based on its suitability for its intended use supported a prima facie obviousness. See MPEP 2144.07.

Allowable Subject Matter

6. Claim 18 is allowed.

7. Claims 2, 8 and 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter: the prior art of record neither teaches nor suggests wherein said dielectric sheath comprises foamed polyurethane.

Response to Arguments

9. Applicant's arguments with respect to claims 1-16 and 18 have been considered but are moot in view of the new ground(s) of rejection.


Conclusion

10. Any inquiry of a general nature or relating to the status of this application should be directed to the Group Receptionist whose telephone number is 571-272-2800. See MPEP 203.08.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner George Fourson whose telephone number is (571) 272-1860. The examiner can normally be reached on Monday through Friday.

12. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri, can be reached on (571) 272-1855. The fax number for this group is 703-872-9306 for before final submissions, 703-872-9306 for after final submissions and the customer service number for group 2800 is (703) 306-3329.

Updates can be found at <http://www.uspto.gov/web/info/2800.htm>.


George Fourson
Primary Examiner
Art Unit 2823

Julio J. Maldonado
February 20, 2004